

Low-Cost PCA System for Use in Commercial and Military Aircraft

Innovators at NASA's Armstrong Flight Research Center have patented a low-cost Propulsion Controlled Aircraft (PCA) computer for use in commercial and military aircraft. PCA is a computer-assisted engine control system that helps a pilot fly and land a plane safely when flight controls, such as elevators, rudders, and ailerons, become disabled during flight. The system uses engine thrust to serve as a backup landing system for an airplane that has lost all normal flight controls. Traditional PCA implementation requires expensive modifications to aircraft software and hardware in addition to aircraft recertification. Armstrong's new system employs the use of a dedicated computer that is nonessential for normal aircraft operations (such as a standard laptop PC) and can be used in emergency situations. The computer analyzes aircraft data, such as aircraft state and pilot commands, runs a software algorithm that calculates aircraft throttle position for a given maneuver, and then displays both current and calculated throttle positions to show the pilot where to move throttles to achieve the desired maneuver.

Armstrong has been developing and refining PCA technology for more than 20 years and has received patents for previous versions. The PCA technology has been featured in NASA Tech Briefs, named a NASA Commercial Invention of the Year, and received the prestigious R&D 100 Award, to name just a few of its accolades.

Benefits

- **Improved safety:** Allows a pilot to fly and land a crippled airplane in a manner comparable to that of a healthy airplane, reducing the number of aircraft accidents due to loss of flight controls
- **Low-cost:** Provides PCA capability to a wide variety of aircraft at a fraction of the cost of full implementation, which would require changes to an airplane's engine-control computer
- **Improved maneuverability:** Provides pitch and roll control after primary flight control system failure
- **Efficient:** Improves flight precision and reduces pilot workload during emergency maneuvers

Applications

- Commercial aircraft
- Military aircraft

Patent

Armstrong has one patent issued (U.S. Patent No: [7,711,455](#) →) for this technology.

Commercial Opportunity

This technology is part of NASA's technology transfer program. The program seeks to stimulate development of commercial uses of NASA---developed technologies. NASA is flexible in its agreements, and opportunities exist for licensing and joint development. Armstrong is interested in a partnership to commercialize this technology.

Contact Information

If you would like more information about this technology or about NASA's technology transfer program, please contact:

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